

# Clean Cities and Alternative Fuels in North Carolina

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Triangle J  
Council of Governments



Sponsored through the :

U.S. Dept of Energy

NC Dept. of Administration /State Energy Office

NC Department of Transportation



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION



– U.S DOE initiative to build public-private partnerships to increase the use of:

- Biodiesel
- Ethanol
- Electricity
- Natural gas
- Propane

■ Triangle , Charlotte and Asheville areas

- Coalitions based in area Council of Governments
- Supported through funding provided the State Energy Office

# U.S Department of Energy's Clean Cities program created in response to Energy Policy Act (EPAct) of 1992

More than 80  
coalitions  
nationwide

Clean Cities  
stakeholders have  
added more than  
157,000  
alternative fuel  
vehicles to their  
fleets, displacing  
more than 100  
million gallons of  
petroleum.



# Primary alt fuel related activities in North Carolina

## ❑ Clean Cities Coalitions & EPA Act principle drivers

## ❑ State efforts

- ✓ Dept of Administration
- ✓ Dept of Transportation
- ✓ Dept of Environment & Natural Resources

## ❑ Federal efforts

- ✓ Camp Lejeune - US Marines
- ✓ Seymour Johnson Air Force Base
- ✓ Cherry Point - US Marines
- ✓ Butner Correctional Institution ( CNG Honda Civic)

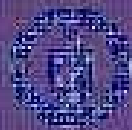
TOTAL Federal ANNUAL B20 USE 450,000 gallons



# Clean Cities is expanding to include additional petroleum displacing strategies:

- Hybrid electric vehicles
- Fuel economy
- Fuel blends
- Anti- idling

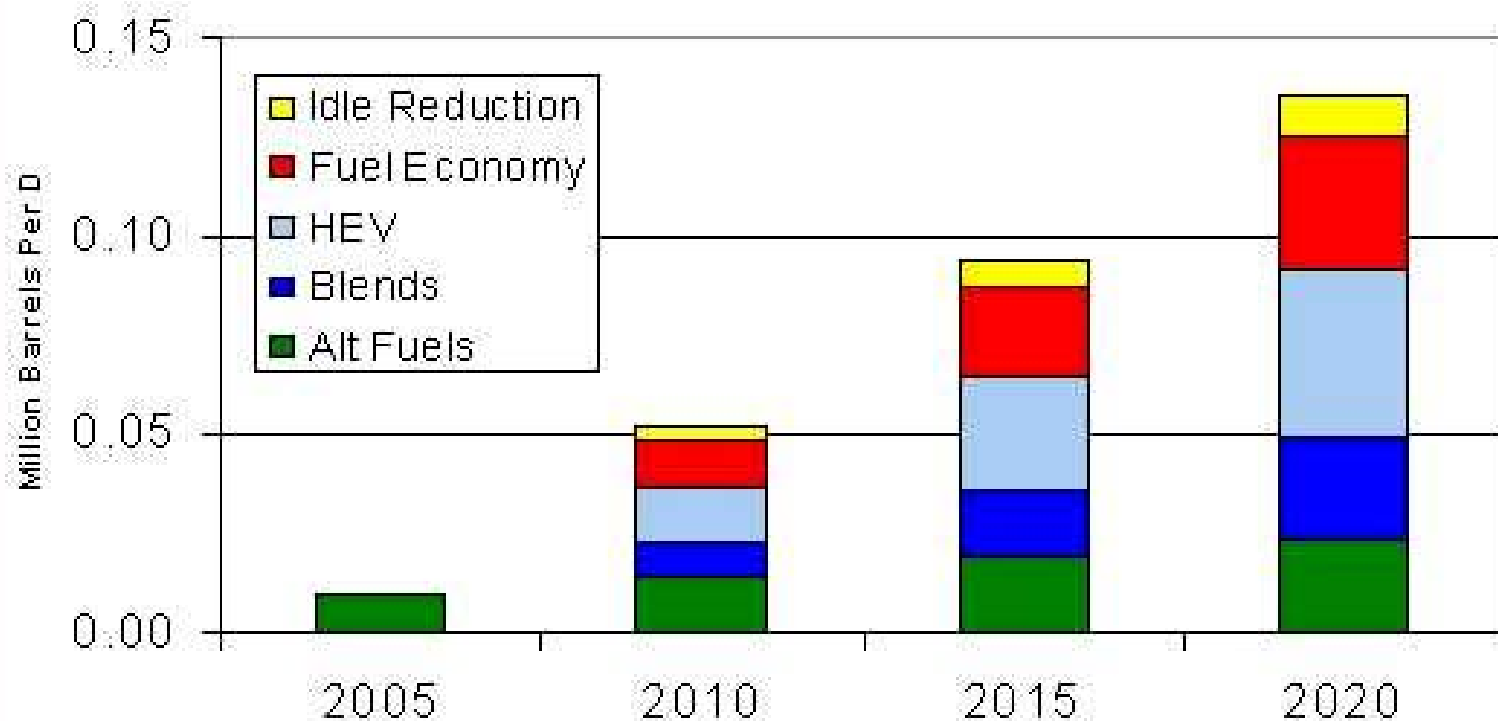
By expanding the Clean Cities portfolio, NREL estimates that by 2015 petroleum consumption can be reduced by as much as **1 M barrels** a day



U.S. Department of Energy  
Energy Efficiency  
and Renewable Energy



# Substantial Oil Displacement From Expanded Portfolio



## Clean Cities has been very effective at increasing the use of alternative transportation fuels:

### Highlights:

- 2001 Triangle Clean Cities was designated into the National program
- 2002 TJCOG was awarded a total of \$340,000 to administer a Biofuels Program in Wake & Durham Counties
- 2003 Use of biodiesel (B20) in the Triangle grew 384% over 2002. Over 1.8 M gallons were used by stakeholders
  - 2004 TJCOG & TCC launch a \$100,000 AFV Incentive Project to rebate costs associated w/ AFVs alt fuels and refueling apparatus



# Biodiesel use

- NC Dept of Transportation
- Cities of Greensboro & Raleigh
- Towns of Garner, Cary, Chapel Hill & Carrboro
- Durham Public Schools
- Raleigh Durham Airport
- Wake & Orange Counties
- NC State and Duke Universities

# BIODIESEL

- Renewable fuel made from soy oil, cooking oil, animal fats
- Can be blended easily with diesel
- Non-toxic and biodegradable
- 3.2-1 energy balance





Triangle J  
Council of Governments

# BIOFUELS PROGRAM

- \$280,700 CMAQ funding awarded by NC DOT with \$60,000 match by NC State Energy Office (SEO) for 3 year program
- SEO match for administration allowed for dedication of \$265,000 to fund entities in Wake and Durham Counties for the cost differential for E85 and biodiesel
- So far \$212,359 in funding has been granted to 8 entities for the use of B20



## CMAQ Funded Biofuels Program :

- ✓ Built public private partnerships ( \$87,000 cost share contributed by Mar '04 – 33% in addition to cost share provided by SEO & TJCOG)
- ✓ Reduced harmful emissions
- ✓ Increased awareness
- ✓ Expanded use of renewable fuel ~ Over 730,000 gallons of B20 by Mar 04





❖ Wake County Env. Service Dept awarded \$23,350 for B20, additional funds for E85



❖ Duke University awarded \$28, 120 to operate 31 campus transit buses & 14 recycling and sanitation vehicles



NC State University awarded a total of \$7,250 for B20 use in recycling trucks, forklifts etc. Additional funds coming for use of B20 by Wolfline



Town of Cary awarded \$3,256 for C-Tran use of B20





DPI & Durham Public Schools  
awarded \$75,000 for use of  
B20 in all 284 buses. DPI  
contributed \$125,000



Raleigh Durham Airport awarded total of  
\$17,467. Began with 7 buses with 1<sup>st</sup>  
grant, now expanded to 12



# Funds to support NC's 1st two B20 pumps at a service stations in Garner & Durham



Garner station opened June 2003-  
sales increases 50-75% over previous  
months





April 22, 2004 ~Earth Day  
opening at 4401 Roxboro  
Rd Exxon



# Centralina Clean Fuels Coalition:

- Charlotte program plan recently approved by US DOE, planning designation event
- 2 of the 3 MPO's have joined as stakeholders, expect 3<sup>rd</sup> MPO and RPO's to join
- NC DOT used over 590,000 gals of B20 in region & City of Monroe expects to transition to B20 in the next 6 months
- Anticipate 50 truck parking spaces will be fitted with Advanced Travel Center (Truck-stop) Electrification to be funded through a proposal that was jointly submitted by 3 states

CONTACT : Jason Wager 704-348-2707

# Asheville Clean Cities

- Land of Sky Regional Council received funding in 2003 from State Energy Office for CC planning phase. Hopes to receive US DOE CC designation in 1-2 years
- Kick-off event planned for April, Clean Air Car Fair planned for August
  - City of Asheville receiving \$400,000 grant from Division of Air Quality for CNG station
- Showcasing propane school bus on national tour
- CONTACT Bill Eaker 828-251-6622



# NC Department of Administration



**State Energy Office** is  
PRIMARY SUPPORT agency  
for alt fuel activities

- supports Clean Cities Coalitions directly
- serves as contract agency for federal DOE SEP grants (funding for AFV activities that is only available to Clean Cities stakeholders)

- **Motor Fleet Management** used 282,000 gallons of E85 in 2003
  - operates 2 stations in Raleigh that offer E85, also 1 CNG and propane station
- Initiated a state purchasing contract for E10 in October'03 (in first months over 175,000 gallons used)

# ETHANOL

- Renewable fuel produced by fermenting organic materials
- High octane, non-toxic, water soluble, biodegradable
- Lower life cycle greenhouse gas emissions
- Supports agriculture



# E85 Flex Fuel Vehicles

- Daimler Chrysler Minivans
- Dodge Stratus, Chrysler Sebring
- Ford Explorer, Taurus and Supercab Ranger
- Chevy Silverado
- GM Suburban, Tahoe , Yukon
- GMC Sierra ½ ton pickup

FFVs are identified by 2<sup>nd</sup>, 3<sup>rd</sup> & 8<sup>th</sup> digit on VIN

**E10 can operate in ANY GASOLINE  
VEHICLE**



# NC Department of Transportation



- Used 1.9 M gallons of B20 in 22 locations 9'02-9'03
- Responsible for a state purchasing contract for biodiesel
  - operates dozens of vehicles on Propane
- Sponsoring a study at NC State on B20 emissions in new diesel trucks
- Ferry system considering a switch to B20
- CMAQ funding supporting TJCOG Biofuels Program

# NC DENR –Division of Air Quality



- Since 1993 NCGA has authorized 1/64 cent per gallon of gasoline sold in NC to fund Mobile Source Emission Reduction Grant Program (approx \$800,000 annually)

- MSERG has funded development of CNG refueling in Garner, Greenville, Asheville, Raleigh, Greensboro, Winston Salem, Gastonia, Rocky Mount, Charlotte, Hickory, Davidson & Caldwell Counties

CNG/LNG reduces emissions up to 97% for CO & PM, 75% for HC & 60% for NOx



# How do emissions levels compare?

Tier 1 

Single occupant

TLEV 

Two occupants

LEV 

over Three occupants

ULEV 

over Six occupants

GX



Honda Civic GX achieves 1/10 ULEV

over 62 occupants

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## AFV Carpool Equivalents of Different Emission Standards



# ELECTRICITY

- Hybrid electrics slash emissions, increase fuel economy
- Newer applications include passenger vehicles, buses, trolleys, Neighborhood electric vehicles
- Allison bus has 2 electric motors in transmission, using them to start the diesel engine, drive the bus at slow speed, and control the speed and torque transfer of the vehicle



GM Allison 40ft hybrid  
electric bus

# PROPANE

- By-product of natural gas & crude oil
- Most widely used alternative fuel around the world
- Excellent safety record
- Stored as a liquid, high amount of energy in small amount of space
- Relatively inexpensive re-fueling infrastructure



Ford 150 Bi-fuel



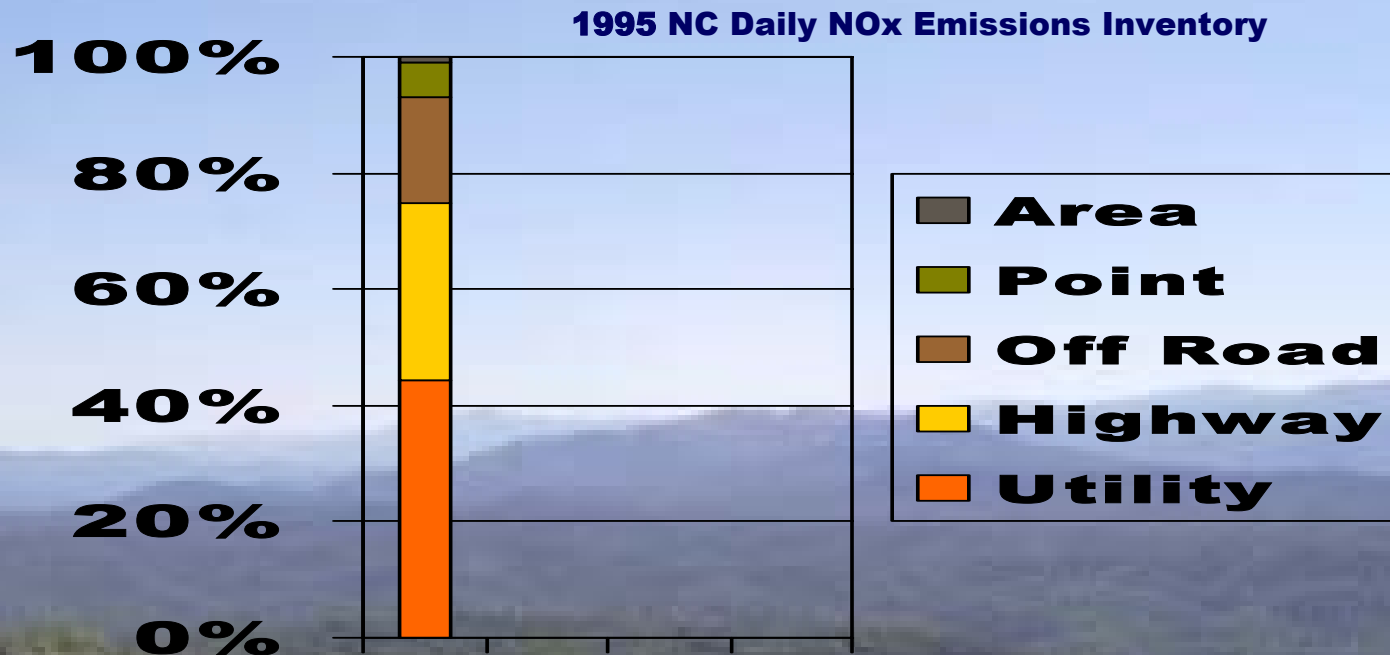
# Key Elements of Public Site Plan

## ■ Station Economics

- Station Costs - \$30,000 to \$40,000
- Vehicles: Year 1 15 Year 2: 30
- Total Count After 3 years equal 50 vehicles
- Average of 2500 gallons per vehicle/year
- Average costs of fuel per gallon
  - Range using current prices \$1.03 to \$1.13 (ex state tax)
- ROI is 28.9% with 3 year payout



# How is Air Quality linked to transportation?





# American Lung Association 2004 America's 25 Most Ozone Polluted Cities

- **#14** Charlotte, Gastonia, Rock Hill
- **#16** Greensboro, Winston Salem, High Point
- **#23** Raleigh, Durham, Chapel Hill

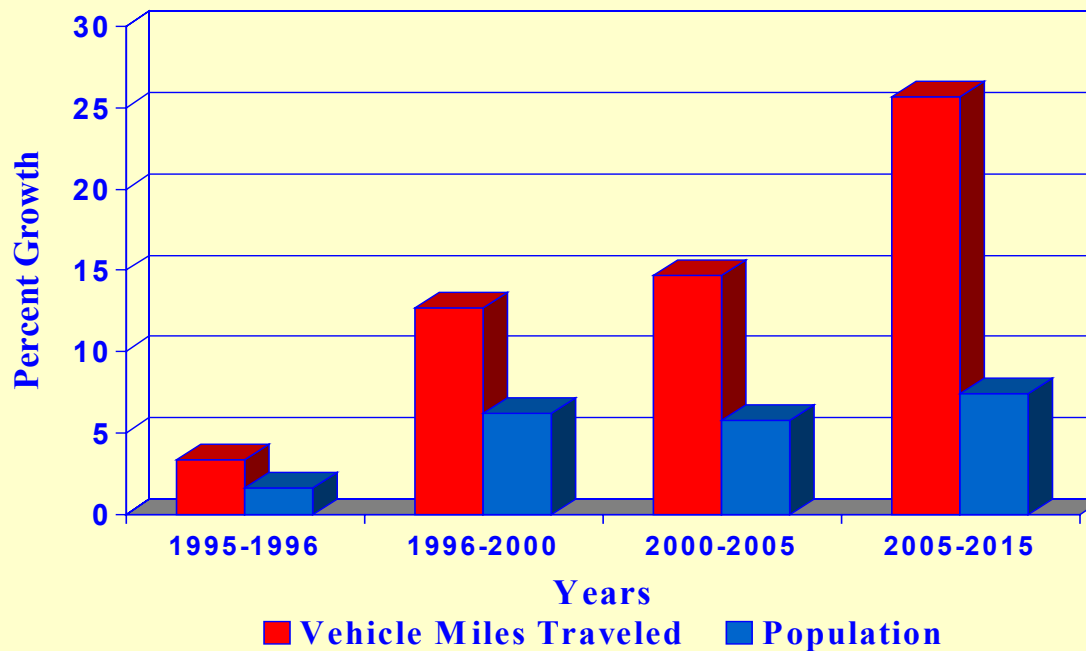
## Six NC Counties get failing grade for PM

Especially impacted:

- ❖ **1.9 million** adults over 65 & 14 and under
- ❖ Over **685,370** asthma, bronchitis & emphysema patients
- ❖ **1.2 million** with cardiovascular disease

# Growth in Vehicle Miles Traveled

## GROWTH IN NORTH CAROLINA (past and projected)



# Air Quality effects :



## Agriculture





# Emission Reductions

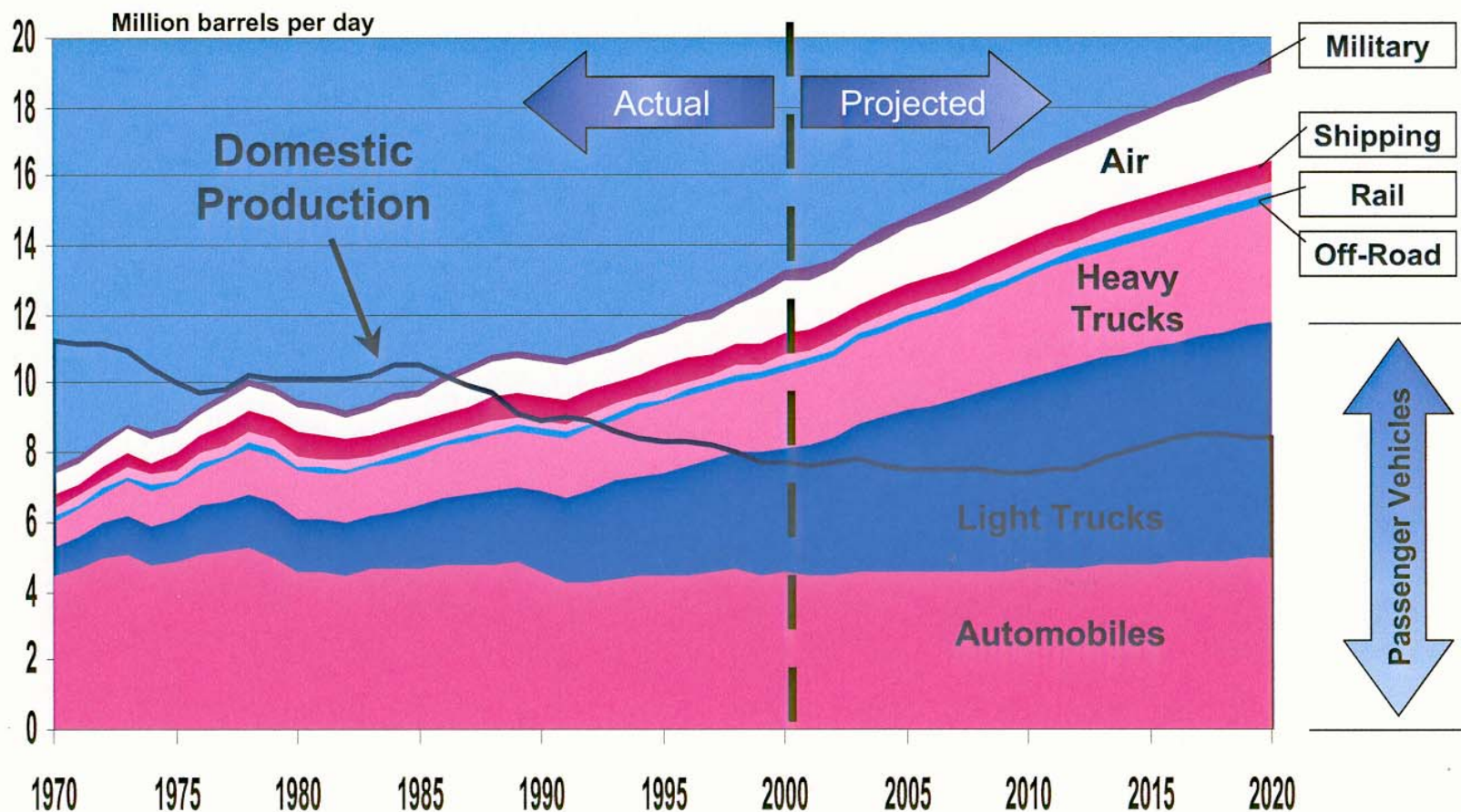
Fuel	CO	HC	NOx	PM
Biodiesel B100	43.2%	56.3%	+5.8%	70%
CNG/LNG	90-97%	50-75%	35-60%	90-97%
EV/HEV	Potential 0 emissions	HEVs are ULEV & SULEV		
E85	40%	15%	10%	20%
LPG	30-35%	20-40%	15-99%	80-95%

**The vision of Clean Cities is to reduce dependence on imported petroleum and improve air quality**

## ❖ ***Domestic Security***

- Transportation sector is 97% dependant on oil
- Transportation uses energy equivalent of all US oil production plus 40 % of all imports
- US has 3% of worlds oil yet we consume 25% of production
- Transportation accounts for 67% of the oil used currently and 70% increase is expected in the next 20 years

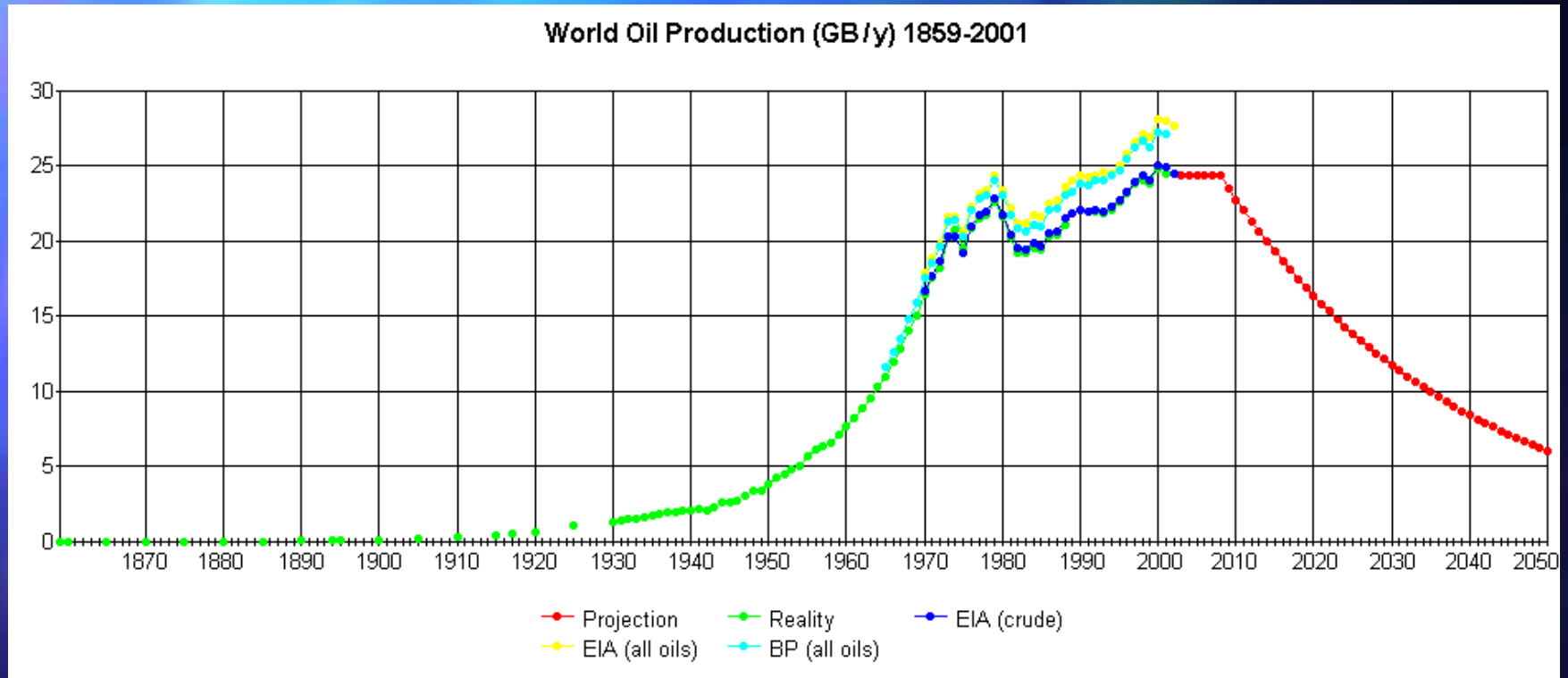
# U.S. Transportation Petroleum Use



Sources: EIA Annual Energy Outlook 2002, DOE/EIA-0383(2002), Dec 2001  
DOT 2002 Pocket Guide to Transportation, BTS02-02, February 2002



# Projected World Oil Production





NC imports virtually all of it's fuel resources-

**\$5 Billion** that could be used to develop domestic energy resources.

**Petroleum** tops the list providing **57%** of total energy in NC

# The Price We Pay for DEPENDANCY



Photos courtesy of the  
National Ethanol Vehicle  
Coalition



# ***Air Quality & Energy Independence***

- Alternative fuels are *American Fuels*
- All alternative fuels improve emissions
  - Natural Gas, LPG, & Electric provide significant reductions in NOx & other criteria pollutants
  - Biofuels reduce CO, greenhouse gases, other emissions of concern, and supports AGRICULTURE
- Alternative fuels are a stepping stone to Fuel Cell Vehicles

# Looking ahead:



Expand CMAQ funded Biofuels Program and/or Alternative Fuels Incentive Project to provide cost share funding to reduce transportation emissions & build public private partnerships

## • LEGISLATIVE EFFORTS~

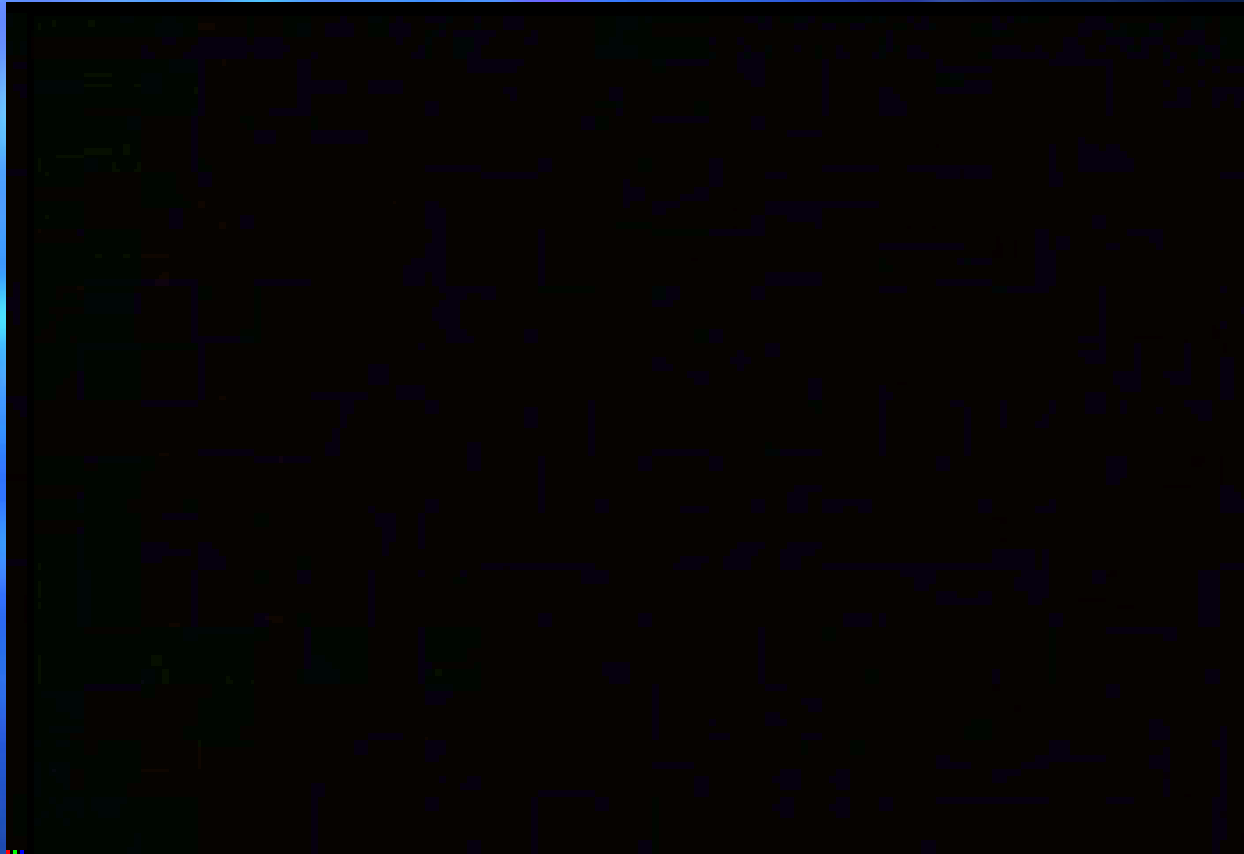
H806- raise in vehicle registration fees to support AFVs, biofuels & infrastructure grants and rebate

H 1636 -Biofuel specific bill, TCC recommending distributor (.01 per %) & production credits to expand use and begin production in NC

H1705 – remove excise tax on biodiesel

Working with Senate leadership on possible funding mechanism for Clean energy/transportation

# 30 second public service announcement





Fueling Alternative Choices Today!  
[www.trianglcleancities.org](http://www.trianglcleancities.org)



Contact :

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Consider joining a Clean Cities Coalition now!